AMENDMENTS TO THE CLAIMS

Claim 1 (currently amended). An elongate ~~device~~microwave radiator for insertion into a living body to treat biological tissue at a predetermined operating frequency, the ~~device~~radiator comprising:

a monopole ~~having an~~ antenna at its tip~~for coupling radiation into biological matter~~; and

~~a~~ dielectric ~~body~~material surrounding the antenna, the dielectric material being configured to act as a resonator at said predetermined operating frequency, ~~so as to encompass~~and encompassing ~~substantially~~generally the whole of the near-field ~~of the~~ radiation emitted by the antenna.

Claims 2-4 (cancelled).

Claim 5 (currently amended). A ~~device~~radiator as claimed in claim 1 in which the dielectric ~~body~~material comprises a ~~substantially~~generally cylindrical ~~portion~~body with the antenna extending axially at its center a distance L.

Claim 6 (currently amended). A ~~device~~radiator as claimed in claim ~~2~~1 in which the radial extent of the dielectric ~~body~~material ~~extends from~~ relative to the antenna ~~a distance substantially~~is generally equal to half ~~the~~a wavelength of ~~said~~ radiation in the dielectric material at said predetermined operating frequency.

Claim 7 (currently amended). A ~~device~~radiator as claimed in claim 1 in which the dielectric ~~body~~material is such that it has a dielectric constant at its core which is higher than the dielectric constant at its outer periphery, the latter being more closely matched to that of said ~~living~~biological tissue.

Claim 8 (currently amended). A ~~device~~radiator as claimed in claim 7 in which the dielectric ~~body~~material comprises an inner core and an outer layer, each of a different dielectric constant.

Claim 9 (currently amended). A ~~device~~radiator as claimed in claim 8 in which the inner core and outer layer have those dimensions that extend from the antenna determined in accordance with the dielectric constant of each so that the overall dimension is a predetermined fraction of the nominal wavelength of the radiation in the dielectric.

Claim 10 (currently amended). A ~~device~~radiator as claimed in claim 9 in which the inner core and outer layer each have a dimension ~~substantially~~generally equal to a quarter of the wavelength of radiation therein.

Claim 11 (currently amended). A ~~device~~radiator as claimed in claim 8 in which the outer layer is formed with indentations in its outer surface which serve to reduce the dielectric constant in this region when the indentations are filled with other matter.

Claim 12 (currently amended). A ~~device~~radiator as claimed in claim 7 in which the dielectric constant of the dielectric ~~body~~material varies continuously in space over at least a part of the distance from the antenna.

Claim 13 (currently amended). A ~~device~~radiator as claimed in claim 1 which has a tip portion that extends beyond the end of the antenna.

Claim 14 (currently amended). A ~~device~~radiator as claimed in claim 13 in which the tip portion is pointed to assist penetration of biological matter.

Claim 15 (currently amended). A ~~device~~radiator as claimed in claim 14 in which the tip portion is composed of a different material to the dielectric ~~body~~material.

Claim 16 (currently amended). A ~~device~~radiator as claimed in claim 13 in which the tip portion is an extension of the dielectric ~~body~~material and is rounded so as to support forward transmission of radiation.

Claim 17 (currently amended). A ~~device~~radiator as claimed in claim 16 in which the tip portion is ~~substantially~~generally hemispherical.

Claim 18 (currently amended). A ~~device~~radiator as claimed in claim 17 in which the tip portion has a radius ~~substantially~~generally equal to half the wavelength of the radiation in the dielectric at said predetermined frequency.

Claim 19 (currently amended). A ~~device~~radiator as claimed in claim 1 in which the elongate device comprises a coaxial conductor with a central conductor that projects beyond outer screening of the coaxial conductor at the distal end to form the antenna.

Claim 20 (currently amended). A ~~device~~radiator as claimed in claim 19 in which the antenna has a length ~~substantially~~generally equal to half the wavelength of the radiation in the dielectric.

Claim 21 (currently amended). A ~~device~~radiator as claimed in claim 19 including a transformer between the coaxial conductor and the dielectric ~~body~~material to reduce reflection of radiation back into the coaxial conductor at the boundary with the dielectric ~~body~~material.

Claim 22 (currently amended). A ~~device~~radiator as claimed in claim 21 in which the transformer includes a space within the coaxial conductor into which packing of the coaxial conductor can expand.

Claim 23 (currently amended). An elongate ~~device~~radiator for insertion into a living body to treat biological tissue at a predetermined operating frequency, the ~~device~~radiator comprising ~~having an~~:

a monopole antenna at its tip ~~for coupling radiation into biological matter;~~ and

a ~~dielectric body~~material surrounding and extending beyond the antenna ~~and extending axially of, and beyond the end of, the antenna~~, the dielectric material ~~and~~ terminating in a rounded ~~end~~tip portion and configured to act as a resonator at said predetermined operating frequency thereby to enhance ~~that has a progressively reducing cross section along the axis away from the antenna, whereby~~ transmission of radiation in the forward direction ~~from the rounded end is enhanced~~.

Claim 24 (cancelled).

Claim 25 (currently amended). A ~~device~~radiator as claimed in claim ~~24~~23 in which the tip portion is ~~substantially~~generally hemispherical.

Claim 26 (currently amended). A ~~device~~radiator as claimed in claim 25 in which the tip portion has a radius ~~substantially~~generally equal to half the wavelength of the radiation in the dielectric.

Claim 27 (currently amended). A ~~device~~radiator as claimed in claim 23 in which the antenna has a length L ~~extends into the dielectric body a distance~~ ~~substantially~~generally equal to half ~~the~~a wavelength of said radiation in the dielectric material at said predetermined operating frequency.

Claim 28 (currently amended). A ~~device~~radiator as claimed in claim 23 in which the dielectric ~~body~~material comprises a ~~substantially~~generally cylindrical body ~~portion~~ with the antenna ~~means~~ extending axially at its center said distance L.

Claim 29 (currently amended). A ~~device~~radiator as claimed in claim 23 in which the radial extent of the dielectric ~~body~~material relative to ~~extends from~~ the antenna ~~a distance substantially~~is generally equal to half a wavelength of ~~the~~ radiation in the dielectric ~~body~~material at said predetermined operating frequency.

Claim 30 (currently amended). A method of coupling radiation into biological material, the radiation being generated by an applicator comprising an antenna surrounded by a dielectric body, comprising the steps of:

configuring the dielectric body to act as a resonator; and

selecting the dielectric constant of the body in accordance with the wavelength of the radiation in the dielectric so that ~~substantially~~generally the whole of the near-field of the radiation is encompassed by the dielectric body.

Claim 31 (cancelled).

Claim 32 (currently amended). A method as claimed in claim 30 in which the dielectric body extends from the antenna a distance ~~at least substantially~~generally equal to ~~$2L^2/\lambda$, where L is the major dimension of the antenna and λ is the~~half a wavelength of the radiation in the dielectric.

Claim 33 (currently amended). A method as claimed in claim 30 in which the major dimension of the antenna is its length, which is ~~substantially~~generally equal to half a wavelength of the radiation in the dielectric.

Claim 34 (previously amended). A method as claimed in claim 30 in which the dielectric body is located in relation to the biological material so that the far-field radiation lies within the biological material.

Claim 35 (previously amended). A method as claimed in claim 30 in which the dielectric constant of the body is high, but is lower than that of the biological material.

Claim 36 (previously amended). A method as claimed in claim 30 in which the dielectric constant of the dielectric body varies, and is higher at its core than its outer periphery, and the dielectric constant at its outer periphery is lower than that of the surrounding biological matter.

Claim 37 (previously amended). A method as claimed in claim 35 in which the dielectric constant at the core is greater than the dielectric constant of the biological matter.

Claim 38 (currently amended). A method of coupling radiation into biological material, the method including the steps of:

~~the radiation being generated by~~providing an elongate applicator comprising an antenna surrounded by a dielectric body, the dielectric body being configured so as to extend axially of, and beyond the end of, the antenna and terminate in a rounded end portion that has a progressively reducing cross section along the axis away from the antenna;

causing the dielectric body to act as a resonator at the predetermined operating frequency; and

transmitting~~, whereby transmission of~~ radiation from the rounded end ~~is enhanced~~.

Claim 39 (currently amended). A method as claimed in claim 38 in which the step of transmitting radiation includes ~~radiation is~~ partially ~~reflected~~reflecting the radiation internally of the dielectric body so as to be transmitted in the forward direction.

Claim 40 (currently amended). A method as claimed in claim 39 in which the step of providing an elongate applicator includes providing a dielectric body having ~~the~~ a dielectric constant ~~of the body~~that is high but is lower than that of the biological material.

Claim 41 (currently amended). A method as claimed in claim 38 in which the step of providing an elongate applicator includes providing a dielectric body that has a ~~substantially~~generally hemispherical tip portion with a radius ~~substantially~~generally equal to half the wavelength of the radiation in the dielectric.

Claim 42 (currently amended). A method as claimed in claim 38 in which the step of providing an elongate applicator includes providing an antenna that has a length ~~substantially~~generally equal to half the wavelength of the radiation in the dielectric.

Claim 43 (currently amended). A method as claimed in claim 38 in which the step of providing an elongate applicator includes providing a dielectric body that extends from the antenna a distance ~~substantially~~generally equal to half the wavelength of the radiation in the dielectric.

Claim 44 (currently amended). A method of treating a tumor in a liver using a radiation applicator comprising an elongate radiator body with a pointed tip for insertion into the liver and a power input to generate microwaves within the body and to transmit microwave radiation into the liver, the method comprising the steps of:

penetrating the liver with the pointed tip;

inserting the ~~pointed tip~~body into the liver ~~at a point in~~to the region of the tumor; and

powering the applicator via the power input to transmit microwaves and heat said region of the tumor.

Claim 45 (currently amended). An elongate ~~radiation applicator~~microwave radiator for insertion into a living body to treat ~~couple radiation into~~ biological material at a predetermined operating frequency, the ~~applicator~~radiator comprising:

- ~~an~~a monopole antenna; and

~~a~~ dielectric ~~body~~material surrounding the antenna, the length of the antenna and the dielectric constant and dimensions of the dielectric ~~body~~material relative to the antenna being selected in relation to ~~an intended~~the predetermined operating frequency of the applicator ~~so~~such that the dielectric ~~body~~material acts as a resonator at the predetermined operating frequency and encompasses ~~substantially~~generally the whole of the near-field ~~of~~ radiation emitted by the antenna.